

Claims

[c1]

1. A flexible quadrature coil circuit for use in an electronically commutated dynamoelectric machine for sensing an angular rotational position of a rotor relative to a stator, the stator having a plurality of stator teeth, each stator tooth having an inwardly facing arcuate surface with at least one raised projection and a channel disposed along a vertical axis of the tooth, the flexible circuit comprising:

a flexible electrically nonconductive substrate;

a plurality of vertically aligned apertures formed in the substrate, the apertures configured to receive the at least one corresponding raised projection of the stator tooth so as to releasably secure the substrate to the arcuate surface of the stator teeth;

at least one continuous electrical conductor embedded in the substrate in a serpentine pattern, the continuous conductor forming a plurality of spaced apart conductor portions disposed between the vertically aligned apertures; and the conductor portions being vertically aligned with and received into the channel of the stator tooth when the flexible substrate is secured to the arcuate surface of a selected stator tooth.

[c2]

2. A flexible quadrature coil circuit for use in an electronically commutated dynamoelectric machine for sensing an angular rotational position of a rotor relative to a stator, the stator having a plurality of stator teeth, each stator tooth having an inwardly facing arcuate surface with at least one elongated rib and a channel disposed along a vertical axis of the tooth, the circuit comprising:

a flexible electrically nonconductive substrate;

at least one slot formed in the substrate, the at least one slot configured to receive the at least one corresponding rib so as to releasably secure the substrate to the arcuate surface of the stator tooth;

at least one continuous electrical conductor embedded in the substrate in a serpentine pattern, the continuous conductor forming a plurality of spaced apart conductor portions disposed between selected slots; and

the conductor portions being vertically aligned with and received into the channel of the stator tooth when the flexible substrate is secured to the arcuate

surface of selected stator teeth.

[c3] 3. The flexible circuit as defined in claim 2 wherein said substrate includes first and second folded tab portions formed at opposite lateral sides of the substrate, the tab portions configured to releasably grip opposite lateral edges of the stator tooth.

[c4] 4. The flexible circuit as defined in claim 2 wherein the substrate is disposed against all of the stator teeth of the rotor.

[c5] 5. The flexible circuit as defined in claim 2 wherein the substrate is disposed against less than all of the stator teeth of the rotor.

[c6] 6. The flexible circuit as defined in claim 2 wherein the rib forms an interference fit when received within the corresponding slot.

[c7] 7. The flexible circuit as defined in claim 2 wherein the substrate includes a number of said slots equal to a number of said ribs on the stator teeth;
8. The flexible circuit as defined in claim 2 wherein said substrate is formed of a flexible plastic material.

[c8] 9. The flexible circuit as defined in claim 2 wherein said substrate is formed of at least two laminated layers of nonconductive plastic material.

[c9] 10. The flexible circuit as defined in claim 2 wherein the electrical conductor is disposed between two laminated layers.

[c10] 11. The flexible circuit as defined in claim 2 wherein a plurality of turns of the electrical conductor are embedded in the substrate, each turn of the electrical conductor being electrically insulated from the other turns of the electrical conductor.

[c11] 12. The flexible circuit as defined in claim 2 wherein the electrical conductor is disposed in the substrate in a square-wave pattern.

[c12] 13. The flexible circuit as defined in claim 2 wherein the electrical conductor is disposed in the substrate in a serpentine pattern.

[c13]

14. A flexible quadrature coil circuit for use in an electronically commutated dynamoelectric machine for sensing an angular rotational position of a rotor relative to a stator, the stator having a plurality of stator teeth, each stator tooth having an inwardly facing arcuate surface with at least one elongated rib and a channel disposed along a vertical axis of the tooth, the circuit comprising:
a flexible electrically nonconductive substrate;
means for receiving the at least one corresponding rib so as to releasably secure the substrate to the arcuate surface of the stator tooth;
at least one continuous electrical conductor embedded in the substrate in a serpentine pattern, the continuous conductor forming a plurality of spaced apart conductor portions; and
the conductor portions being vertically aligned with and received into the channel of the stator tooth when the flexible substrate is secured to the arcuate surface of selected stator teeth.

[c14]